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group of students, as reported to me by the university.

These students, numbering 308, were classified November 1, 1914, under "Other Courses," and were included in the total for the university. Unfortunately, for November 1, 1915, the same group of students, numbering 607, were classified under "Extension and Similar Courses"—a classification not included in the total. This makes the discrepancy in the comparison of totals and accounts for the apparent loss reported.

Professor James Sutton, recorder of faculties of the University of California, reports that of the 3,317 students listed in the statistics in *SCIENCE* of January 21, 1916, under "College," 174 are students in the school of architecture.

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QUOTATIONS

SCIENCE ON THE WAR PATH

No unofficial war document thus far published can compare in importance with the manifesto issued yesterday on the subject of our national neglect of science. The signatories include many of the foremost scientific names of the day. The arguments are crushing in their conclusiveness. Best of all, if it is permissible so to speak, the manifesto is issued at a time when we are face to face with the most lurid of object lessons. The bulk of our failures in the war have been a consequence of our neglect of that scientific energy, strenuousness and organization of which the Germans make so much. We believe their achievements in this field are exaggerated. At the same time, they are far too obvious for us to remain undisturbed by them unless we mean to resign our ancient place in the world.

The signatories of the scientific manifesto point out that our highest ministers of state are mostly ignorant of the obvious facts and principles of "mechanics, chemistry, physics, biology, geography and geology." It will be noted that economics is not included, possibly because it is regarded as a department of biology. The same ignorance, as the scientists

say, runs through the public departments of the civil service, and is nearly universal in the House of Commons. Its existence has been demonstrated by the announcement, on the part of a member of the government, that the possibility of making glycerine from lard was a recent discovery. Doubtless some other minister will shortly allude to the law of gravitation or to spectrum analysis as phenomena which have recently come within the cognizance of the government. The remedy for this state of affairs, in the opinion of the distinguished scientists, "is a great change in the education which is administered to the class from which public officials are drawn." Science should play a larger part in the civil servants' examinations, to the exclusion of Latin and Greek. "Eventually, the Board of Trade would be replaced by a Ministry of Science, Commerce and Industry, in full touch with the scientific knowledge of the moment." In those circumstances, the manifesto goes on to say, with an optimism which is almost pathetic, "public opinion would compel the inclusion of great scientific discoverers and inventors as a matter of course in the Privy Council and their occupation in the service of the state." But if the Privy Council is to be filled up with scientific discoverers, how are party hacks and political schemers to be rewarded for their sycophantic services where they can not afford to pay the price for a knighthood or a peerage?

About the peremptory necessity of better scientific organization on national lines there can be no two opinions. It is not only a question of our prosperity, but of our existence. The law of the survival of the fittest works just as inexorably among nations as it does among individuals. We can be the fittest if we like. Unless we *do* like we shall not survive. But if we are to tackle seriously this problem of scientific reorganization, we shall have to scrap the whole of our rotten and antiquated political machinery. The scientific mind and temper can not possibly flourish in an atmosphere of political trickery, nepotism and plunder such as that which has surrounded us for the last few centuries. For

instance, what is the first characteristic of the true scientific spirit? Surely, the desire to ascertain the whole of the facts, and then to pass an unbiased judgment upon them. The true scientist, secure of his data, will follow his intellect whithersoever it leads him. But these principles are reversed under the House of Commons. In what should be the assemblage of the best national intellect there is no place for intellect at all. No private member of the House of Commons is allowed to pass an independent judgment on facts, scientific or otherwise. Before the data are submitted to him he is told what his opinion must be. If he can not quite make up his mind, he taps humbly at the door of the whip's office and is there told what he thinks. The greatest of all scientific achievements is possibly the Newtonian principle that every portion of matter attracts every other portion of matter in the universe with a force proportionate to the respective masses, and inversely as the square of the distance. If, in normal times, the House of Commons were ordered by the whips of the predominant party to pass a resolution that Newton was wrong, and that "every atom of matter in the universe repels every other atom, conversely as the circle of the distance" (whatever that may mean), the members would file into the division lobby with their customary subservience. In normal political circumstances the House of Commons will pass anything, no matter how mischievous or ludicrous if it is ordered so to do. When the national sovereignty is in the hands of such an assemblage of unintellectual automatons as that, he who anticipates legislative sympathy with scientific achievement might with equal prospect of satisfaction hope to taste green cheese from the moon.

* Very much the same may be said of the civil servants. All the highest posts are filled by private "influence." They go to the ex-private secretaries of ministers and to the sons, sons-in-law, brothers-in-law, nephews, cousins and other relatives of the men who are already "bosses" in the various departments. Talent and distinction are boycotted. Suppose the greatest of scientific discoverers—a

Darwin or a Wallace—to be in rivalry as candidate for a high position in the civil service with some young ass who happened to be the intended son-in-law of a minister or "commissioner." The scientist might as well retire from the contest. The young ass would get the position and a few thousands a year with it. If he were hopelessly unable to discharge the duties, a competent deputy would be engaged at the expense of the taxpayers. That system fills the civil service with the off-scourings of incapacity. Years ago Sir Charles Trevelyan said:

There is a general tendency to look to the public establishments as a means of securing a maintenance for young men who have no chance of success in the open competition of the legal, medical and mercantile professions . . . the dregs of all other professions are attracted towards the public service as to a secure asylum.

Thanks to this wicked system, it was recently announced that no less than five master-ships of the High Court had been bestowed by "influence" on the sons of judges, to the exclusion of hundreds of better-qualified men, who, unfortunately, had not been fathered from the bench. When the administration of justice is itself tainted with nepotism, and when the dregs of every profession are appointed to the highest positions in the public service as a result of private "influence," we have a long way to go before scientific achievement, no matter how distinguished and beneficial, will count for much in this country.

There are, however, some encouraging signs. The political truce is opening the eyes of the public to the stupidity of allowing the British Empire to be run in the interests of political schemers and lazy bureaucrats. Three or four years ago it was a common belief that our insane party system was an essential of effective government. That delusion is gone forever. We are now beginning to understand that an Empire is run on precisely the same lines as a great business. The partners of a great commercial undertaking would not tolerate the presence among them of a man who, like a politician, announced his opposition to proposals before he knew what they were or who,

like a bureaucrat, was incessantly plotting for his own hand and pocket against the interests of the partnership. True science and politics are incompatible. They can not exist together any more than the eagle and the squid can share the same apartment. Science has at this moment the most magnificent opportunity that it has ever enjoyed of seizing the steersmanship of human destiny. Every man who wants to see his country great, progressive and prosperous, marching as a standard-bearer at the head of the advancing legions of mankind, should back the scientists with every ounce of energy that he possesses. If, otherwise, he wishes to see her mean, petty, retrogressive, squalid and contemptible, let him support a return to our debasing party strifes, with their concomitant triumph of the political schemer and all the host of parasites whom he enriches out of public money.—*London Financial News.*

SCIENTIFIC BOOKS

Die Grundlagen der Psychologie. Von THEODOR ZIEHEN. Leipzig und Berlin, B. G. Teubner, 1915. 2 volumes. Pp. vi + 259; vi + 304. Price M. 4.40, geb. M. 5.

Professor Ziehen, long known to psychologists as the author of a very readable "Introduction to Physiological Psychology," has undertaken in his latest work to determine the fundamental principles of psychology. According to his view the science rests upon a twofold basis, its epistemological foundation, and the basal principles of the science itself. The latter may be investigated "autochthonously," that is, with respect to the psychical alone, or in correlation with non-psychical material. The latter investigations furnish the psychophysical and psychophysiological foundations of psychology. In the present work only the epistemological and autochthonous principles are discussed—each in a separate volume.

The author's epistemological standpoint is rigidly phenomenalist. He starts with the totality of the Given (das Gegebene), which he calls the Gignomene. This primary datum is divided into two fundamental classes, sensations and representations (Vorstellungen).

The latter are derivatives of the former. The psychical, which constitutes the subject matter of psychology, is to be regarded as the totality of the Given in relation to a certain "component" of the sensations and representations.

Every sensation datum can be analyzed into two constituents, a "reduction" component and a parallel component. The former is subject to a certain sort of variation—successive changes—and such partial variations constitute the causal series. The second component is subject to a different sort of variation—simultaneous changes—which form the parallel grouping of data. The parallel group includes both independent and dependent variations. The independent variations, so far as we know, occur only in the brain and nervous system. All sensations are subject to dependent variation. Thus among our sense data there are some which stand only in causal and *passive* parallel relations to other data, and some which manifest *active* parallel relations as well—that is, data which produce parallel *effects*. The representative data are resolvable into components analogous to those of sensations. Psychology, according to the author, is the science of the passive parallel components of experience. Such, in bare outline, is Professor Ziehen's demarcation of psychology. Unfortunately, in spite of his endeavor to give mathematical precision to the analysis the meaning of his fundamental terms remains somewhat in doubt.

The fourth chapter contains a very incisive discussion of the historic theories of the Self. The author finds no sufficient ground for assuming the existence of a soul-substance or mind-stuff. The self is merely "an individual collective concept, distinguished by special characteristics" (I., 140). The existence of "other selves" he believes to be comprehensible from his standpoint, while the substance theory, carried out logically, lands us in solipsism.

In Chapter 5 the relation of the "psychical" to the brain is examined. The classic theories, which he designates as causalism, parallelism, materialism, spiritualism, identism and logis-